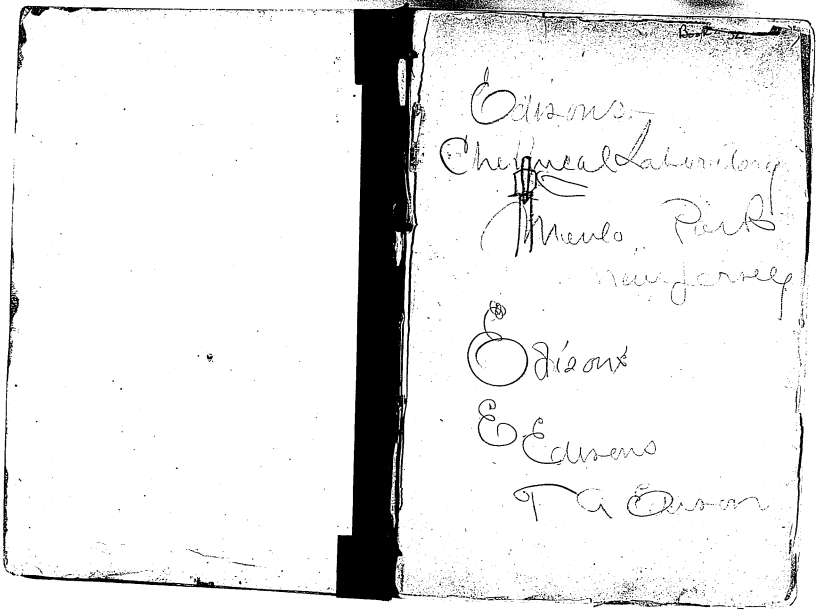
Menlo Park Notebook #32 [N-79-03-10.2]

This notebook covers the period March 1879-July 1880. Most of the entries are by C. E. Mumsell and John W. Lawson. There are also entries by Edison, Charles Batchelor, and Francis Upton. The material by Mumsell consists of notes on lampblack and sulphide experiments. The notes by Lawson relate to experiments on woods for lamp filaments, chalk experiments conducted with Batchelor, and miscellaneous chemical experiments. The material by Edison includes notes on carbon filaments, calculations about electric power distribution, and lists of metal alloys. There are also miscellaneous calculations by Upton and others. The label on the front cover is marked "Woods ect." There are 282 pages numbered back to front, and the book has been used in both directions.

Filming order: pp. 1-231; pp. 282-236 [in reverse page-number order].

Blank pages not filmed: 4-7, 50-51, 56-57, 80-89, 104-107, 132-139, 142-149, 152-187, 190-207, 210-219, 222-227, 232-235, 242-249, 264-265, 272-273.

Missing page numbers: 121-122, 237-240.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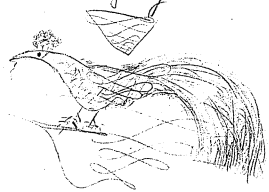
Chemical Laboratory
Menlo Park
New Jersey
Edison
Edisons
To Edison

Edisons

T. A. Edison
Menlo Park
New Jersey



Lampblack.
March 10 – 14th 1879
C E Mumsell.

10.

Index.

Page 11. Heat alone.
" 12. Those made in too small quantity to test.
" 13. Qualitative Analysis.
" 14. Weighings.
" 15. Resistances of Buttons.
" 16. Sist of Bottles.
" 17. Bromine.
" 18. Alcohol.
" 19. Iodine.
" 20. Chromic acid.
" 21. Chlorate of Potassium.
" 22. Carbon Bi-sulphide.
" 23. Potassic Bi-Chromate.
Bleaching Powder.

Lampblack. Heat alone. 11.

1. Extra Eddy's Son's

Heated in Hessian Crucible for 30 minutes at a red heat in coke fire in furnace) the crucible being lined with plaster of Paris, which scaled off by the heat allowing access to the air; Cooled and sieved through 40# sieve. Buttons from this moulded all right, but were too brown. Buttons No. 1. Resistance = 3600 ohms

2.

Heated in Hessian crucible for 1 hour at a red heat in Coke fire in furnace; the crucible being lined with fire clay & sand which acted properly; Cooled & sieved through 40# sieve. Moulded all right; buttons too brown. Buttons No. 2.

3.

Heated in a Hessian crucible for 2 hours, at a red heat in coke fire in furnace; the crucible being lined with fire clay (2 parts) and sand (1 part), which did not crack; Cooled & sieved through 40# sieve.

Small Bottles.

1. 14 parts 10 grms Lampblack
   1 " " KCl
   28 " 20 c.c. Conc. H_2SO_4
   Heated on sand bath for 4 hours, ℔ 10 minutes in Crucible furnace, pulverized ℔ sieved through 40# sieve.
   Hard button which would not mouse.
2. Kerosene Carbon.
3. 1 grm Lampblack
   .3 " KNO_3
   Heated in porcelain crucible for 15 minutes, washed with H_2O & dried.
4. .9 grms Lampblack
   50 c.c. Conc. HCl
   20 " " HNO_3
   Boiled for 6 hours in beaker on sand bath, washed & dried.
5. See Cooth & Morfit, Ency. of chem.
   .5 grms Lampblack
   10 c.c. Alcohol
   20 c.c. NaOH solution
   20 c.c. H_2O_2
   Lampblack digested in beaker with alcohol for 1 hour, filtered, washed on filter with Na OH solution, and then with H_2O, dried in steam bath.
6. 2.5 grms Lampblack
   5 c.c. Conc. HNO_3
   10 " " H_2SO_4
   Heated for 6 hours in porcelain dish on sand bath, dried until all the H_2SO_4 was expelled, pulverized and sieved through 40# sieve.
7. 2 grms Lampblack
   5 c.c. HNO_3 conc.
   5 " H_2SO_4 "
   Heated in porcelain dish on sand bath for 4 hours, washed, filtered, washed & dried.

C, N, Fe,

Books Consulted.

Watt's Dictionary. Vol. 1. P. 759.
Gmelin's Handbook. " 2. " 83.

Lampblack.

Watch glass + lampblack	19.1740
" " "	18.2706
" " " $HCl + HNO_3$	.9034
Watch glass + Lampblack	23.6046
" " "	18.2706
" " " Rx.	4.3340
Watch glass + lampblack "	18.6516
" " " HCl.	18.2706
Carbon button + Watch glass "	.3810
" " " "	18.5756
" "	18.2706
	.3050

Lampblack Buttons.

1.	Kerosene Carbon.						Resistance = 60 ohms
2.	From	1	Page	11.			" = 360 "
3.	"	2	"	"			
4.	"	1	by	Rx.	Page	17.	Resist. 730 Ohms
5.	"	1	"	9.	"	19.	" 870 "
6.	"	2	"	Rx	"	17.	
7.	"	2	"	9	"	19.	
8.	"	2	"	CS_2	"	22.	Resist. 1.02
9.	"	3	"	CS_2	"	22.	" = .

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Large Bottles.

1. No. 1. Page 11.
2. " 2. " 11.
3. " 1. " 17.
4. " 2. " 17.
5. " 1. " 19.
6. " 2. " 19.
7. " 1. " 20.
8. " 1. " 21.
9. " 2. " 21.
10. " 3. " 11.
11. " 1. " 22.
12. " 1. " 23.
13. " 3. " 23.
14. " 1. " 15.
15. " 2. " 22.
16. " 2. " 23.

Sampblack. Br. 1

Sampblack 4.3 grms
Br 4 C.C.
2 C.C.

Sampblack digested with Br in the cold for 16 hours, then with 2.C.C. more of Br., then heated on sand bath, and sieved through 40 ☒ sieve. Buttons from this moulded all right, but resistance too high - 930 Ohms, and too brown in color.

2

Calcined Sampblack 2 grms
Bromine 2 C.C.

Digested in cold for 1 hour, then heated on sand bath for 1 hour. Buttons easily moulded, but brittle and too brown. Resistance = Ohms.

18. C_2H_6O. No. 14.

Lampblack	5 grms.
C_2H_6O	50 c.c.
$(C_2H_5)_2O$	50 "
NaOH solution	60 "
HCl dilute	50 "
HNO_3 "	20 "

Filtered, washed & dried after each operation; sieved through 40# sieve.

Lampblack. 2. No. 5. 19.

Lampblack 3 grms
Iodine 1 "
Heated in porcelain dish for 2 hours on sand bath until all the I was expelled. Sieved through 40# sieve; moulded all right, but buttons were of a brownish black color, with a resistance of 870 Ohms.

2. No. 6.

Calcined lampblack 2 grms
Iodine 1 "
Heated in porcelain dish on sand bath for 2 hours & sieved through 40# sieve. Buttons easily moulded but broke with facility. Resistance = Ohms.

20. 1 $CrCl_3$.

Sampblack	3 grms
$CrCl_3$	1 "
H_2SO_4 conc.	5 C.C.

Heated in porcelain dish on sand bath for 1 hour, washed, filtered, washed & dried.

K_2ClO_3 21.

1.

Sampblack	4 grms
$KClO_3$	.3 "
H_2SO_4 conc.	10 C.C.

Heated in porcelain dish on sand bath for 3 hours, or until all the H_2SO_4 was expelled; washed, filtered, washed, and dried.

2.

Sampblack	5 grms
$KClO_3$	.4 "
H_2SO_4 conc.	8 C.C.

Heated for 2 hours in steam chest, & for 3 hours on sand bath, washed, filtered, washed, & dried.

22

CS_2. No. 11.

Lampblack (Calcined P. 11. #3) 2 grms
CS_2 100 c.c.

Digested for 1 hour in steam chest; washed with 50 c.c. of CS_2, filtered, washed with 30 c.c. of CS_2, then with 50 c.c. of $(C_2H_5)_2O$; dried, heated on sand bath in porcelain dish, sieved through 40# sieve, and reheated.

Buttons mould well, ~~could~~ give very small resistance, 1.02 ℣. .94 ohms without pressure, but .31 ohms under pressure, hence not sensitive enough.

Calcined 2 No. 15.

5 grms. Lampblack (No. 1) levigated in 500 c.c. of H_2O, and about 2 grms of the lighter portion taken. This was dried, treated with 50 c.c. of CS_2 in a porcelain dish in steam chest for 30 minutes, washed with 20 c.c. of CS_2, filtered, and washed first with 30 c.c. of CS_2, and then with 20 c.c. of $(C_2H_5)_2O$; dried and heated on sand bath. Sieved through 40# sieve ℣ reheated.

$K_2Cr_2O_7$. No. 12. 23.

Lampblack 2 grms
$K_2Cr_2O_7$ 2 "
H_2SO_4 Conc. 5 c.c.

Heated for 2 hours in porcelain dish on sand bath; washed, filtered, washed, ℣ dried; sieved through 40# sieve.

$CaCl_2$ + $CaCl_2O$. No. 13.
1

Lampblack 2 grms
Bleaching powder 2 "
H_2SO_4 Conc. 10 c.c.

Digested for 2 hours in porcelain dish in cold, then for 2 hours heated on sand bath, washed, filtered, washed, dried, and sieved through 40# sieve.

2. No. 16.

Calcined Lampblack 2 grms
Bleaching Powder 2 "
Conc. HCl 10 c.c.

Digested for 2 hours in a porcelain dish in the cold; then on sand bath for 6 hours; washed, filtered, ℣ washed; first residue thrown away on account of not drying (from $CaCl_2$); filtrate re-filtered through two filters, ~~and~~ residue washed ℣ dried.

11

Sulphides.

March 15th to April 12th 1879.

O. E. Munsell.

Index of Sulphides

Page		
29.	Aluminium.	Sulphide
29.	Copper.	"
31.	Antimony.	"
33.	Zinc.	"
35.	Bismuth.	"
37 + 39.	Manganese	"
41.	Arsenic	"
42.	Lead	"
43 + 44.	Nickel	"
45.	Tin	"
46.	Iron	"
47.	Cadmium	"
49.	Tungsten	"
51.		
53.	Rose Metal	
55.	Muntz "	
	Bell "	

Sulphide of.

Aluminium	Al_2S_3	Al+S	Too expensive

Cu.

Cu_2S.

Books consulted:—

Roscoe & Schorlemmer's Chemistry. { Vol. II. Pt. I. P. 343.
Watts' Dictionary of " Vol. II. P. 74.

1.

Cu_2S	50 grms
Fused borax	2 "

Would not fuse in plumbago crucible over blast, although heated for 30 minutes: luted with fine clay and sand (2:1) for 35 minutes in Coke fire in furnace: fused well, but spit on casting. No. 1.

2.

Cu_2S	50 grms.

No borax; fused in luted plumbago crucible as before; cast well into bar. No. 2.

Cu_3S.

Cu_2S	50 grms
S	20 "

Ground fine and fused together in Hessian Crucible over blast-lamp for 10 minutes, or until the S. commenced to burn, & cooled. Formed in fine grains which are converted into S. and Cu_2S, when heated above the melting point of S., hence could not be cast.

Cu_2S. 1

Cu_2S 150 grms
Heated for 35 minutes in Hessian Crucible in coke fire. Bar well formed, 78 grms.
Bar broke by falling.

2.

Cu_2S fused (cast bars) 145 grms
" fine (bought) 100 "
Heated for 30 minutes, bar of 110 "

3.

Cu_2S fused 124 grms
" fine 35 "
Heated for 30 minutes, bar oxidized on surface from mould being too damp.

Sb^2S^3.

Books Consulted: —
Watts' Dictionary. Vol. 1. P. 329.

1.

Sb_2S_3 50 grms.
Heated for 10 minutes in Hessian Crucible luted (fire clay & sand) in Coke fire, but did not fuse.

2.

Sb_2S_3 50 grms
Heated as before in Graphite Crucible for 20 minutes, but no fusion: Cooled 20 grms. of Sb_2S_3 added, deluted, and fused for 30 minutes.

3.

200 grms of Sb_2S_3 in fused pieces which were prepared by repeated recastings, were cast into a bar.

Books Consulted:—

Roscoe & Schorlemmer's Vol. II. Pt. I. P. 263.
Watts' Dictionary " V. " 1074.

1.

Granulated Zn	50 grms
Ground roll S	20 "

Heated in Luted Pipe Clay + sand) Hessian Crucible in coke fire (very hot) in furnace for 90 minutes: result a failure, the lute broke and allowed the S. to vaporise, the Zn nearly all vaporized except a small quantity which oxidized, and the ZnO attacked the crucible forming a brownish gray slag, which cooled quickly.

2.

Granulated Zn	100 grms
H_2SO_4 Conc.	400 c.c.
H_2O	1000 "

Zn dissolved in $H_2SO_4 + H_2O$, first in the cold and afterwards by heat: filtered from C. and other impurities, H_2SO_4 neutralized with Na_2CO_3 and $NaC_2H_3O_2$, forming an $HC_2H_3O_2$ solution through which H_2S was passed. Zn S filtered out + dried. 50 grms of Zn S heated in Graphite Crucible for 30 minutes but lute broke so that the Zn nearly all volatized, that which remained formed a dark green crust.

84.

2.

Zn S (prepared as before) ... grms

Watts' Vol. I. P. 595. Bi^2S^3.

85.

Bismuth (ground fine) 40 mesh 60 grms
Sulphur " " 20 "

Heated for 20 minutes in Hessian crucible, but the lute broke and nearly all volatilized.

2.

Bismuth (ground fine, 40 mesh) 60 grms
Sulphur " " 20 "

~~After~~ heating this as before, ~~three~~ following were added:

Bismuth 90 grms
Sulphur 40 "

~~These~~ were heated in a ~~Hessian~~ Hessian crucible with a graphite cover, luted well, but blew up. On heating again with a Hessian cover for 20 minutes in coal fire, Bi^2S^3 was formed, but did not fuse; of this 123 grms were taken and heated as before for 15 minutes forming a small bar and some scraps which weighed altogether 114 grms: this formed a bar weighing 79 grms.

Mn S. 1

37

MnO_2 (natural)	100 grms
H_2SO_4 Conc.	400 C.C.
H_2O	1000 "

Heated together in beaker on sand bath for 14 hours, then transferred to large porcelain (iron) evaporating dish for 10 hours; then taken up with H_2O, and filtered, neutralized with $NaHCO_3$; $Na_2C_2H_2O_2$ added, and precipitate of $Fe_3(OH)_6$ filtered out; NH_4OH & $(NH_4)_2S$ added;

2.

MnO_2 (artificial)	50 grms
$H_2C_2O_4$	5 "
H_2SO_4 Conc.	100 C.C.
H_2O	200 "

1.

MnO_2 (natural) 50 grms
S 20 "

Heated for 30 minutes in Hessian Crucible (luted with pipe clay + sand) in coal fire in furnace; fused well but the bar was entirely composed of air bubbles; bar consisted of Mn SiO3, Silicon from the crucible.

2.

MnO_2 (natural) 50 grms
S 20 "

Heated in graphite crucible, luted with fire clay and sand, in coal fire for 1,00 hours: lower potation semi-fused, upppart a brown powder consisting of Mn S and some $Mn SO_4$. Imperfect fusion due to MnO_2 being too impure.

3.

MnO_2 (artificial) 50 grms
S 20 "

Heated in Hessian crucible

A

A S_2 S_2

A S_2 S_2 100 grms
Heated in Into Hessian Crucible in Coke fire for

PbS.

1

Powdered PbS 87 grms
Mixed PbS 193 grms
Heated in Hessian crucible for 15 minutes in coal fire; gave bar of 134 grms which broke up into several pieces. This bar heated with scraps of mixed PbS, 191 grms in all, for 30 minutes gave fine bar of 141 grms, but had an air-hole on top.

2

Powdered PbS 105 grms
Mixed " 55 "
Heated for 30 minutes in Hessian crucible in coal fire gave good bar.

Ni_2S.

Watt's, Vol. IV, P. 42.

Ni in grains 50 grms
HNO_3 conc. 200 C.C.

Heated in beaker on sand bath until all the Ni was dissolved, then evaporated nearly till the $Ni(NO_3)_2$ crystallized on cooling; reheated until crystals redissolved and 50 C.C. of H_2SO_4 added, then evaporated to dryness in porcelain dish; and sieved through 40 sieve. Then $NiSO_4$ 60 grms were mixed 11 grms of lampblack and heated in a luted Hessian crucible for 1 hour. formed bar full of air bubbles.

Ni S.

Ni 50 grms
HNO_3 conc. 200 C.C.

Ni treated with HNO_3 until brought into solution, then evaporated to dryness, and ignited so as to convert the $Ni(NO_3)_2$ into NiO, which was sieved through 4 mesh.

Sn S.

1.

Sn Rolled & Cut fine 150 grms
S 60 "
Heated in Graphite Crucible in Coke fire, Cover blow off, and S. burnt.

2.

Sn rolled & Cut fine 200 grms
S 80 "
Sn S fused 23 "
Heated for 30 minutes in graphite Crucible in Coal fire, but did not run well into mould on account of the holes being stopped. 386 grms of this fused SnS reheated, formed very fine bars.

Fe S

Fe S (refused) 65 grms.
Fe S (bought) 135 "
Heated for 30 minutes in graphite crucible in coal fire; bar but a shell.
200 grms. mixed Fe S formed one bar of 90 grms; the other was too small and therefore was remelted forming a good 105 grm bar. (with most Fe S)

Cd S.

Watts', Vol. 1., P. 706.

Cd 24 grms.
HNO_3 Conc. 150 C.C.
HCl " 50 C.C.

Cd heated in beaker with 50 C.C. of HCl, but dissolved very slowly, for 1 hour; Then HCl solution decanted off and 50 C.C. of Conc. HNO_3 added to bars of Cd, which dissolved them rapidly; the HNO_3 solution was then evaporated to small bulk, and the HCl solution added, then boiled to expel HNO_3, and then evaporated to dryness: $CdCl_2$ taken up with H_2O, and diluted to 300 C.C. through which H_2S gas was passed for 2 hours; CdS filtered and washed, H_2S being passed through filtrate and the Cd not precipitated. The first time recovered; both ppts of CdS dried,

WS².

Books consulted :—
'Watts' Dictionary. Vol. V., P. 914.

Prep. of Acid Sodic Tungstate :—
50 grms of Na_2WO_4 where heated in beaker with 100 c.c HNO_3) filtered, washed and dried; the WO_3 produced was added to a solution of 100 grms Na_2WO_4 in 200 c.c. of H_2O, and the whole evaporated to dryness producing $3Na_2O, 7WO_3$.

Rose Metal.

Gmelin. Vol. V. Page 180.

Bismuth	2 Parts
Lead	1 "
Tin	1 "

Melts at 93.75°C.

Muntz Metal.

		Mott.	
Cu	60 parts	240	grms
Zn	40 "	160	"

The Cu was heated in graphite crucible for 20 minutes, then taken out, stirred, and Zn added about 10 grms at a time; then stirred, and put back for 5 minutes into fire; then taken out and poured: bar weighed 172 grms; not enough for second bar.

~~Bell Metal~~

2. Mesquet.

Cu	56 pts	224 grms
Zn	40.75 "	163 "
Pb	4.50 "	18 "
	101.25	405 "

Cu was heated in graphite crucible for 20 minutes, then taken out, stirred, and Zn added; put back for 5 minutes and Pb added; then reheated & cast. Bars of 176 & 197 grms.

Bell Metal.

Cu	69 %	276 grms
Sn	31 %	124 "

Cu heated in graphite crucible in coal fire until melted; then taken out of furnace and Sn added; then put back for 5 minutes and then cast. Bars of a white color and brittle; weighing 177 and 196 grms.

Cu 78 %
Sn 22 %

2.

Lawson.

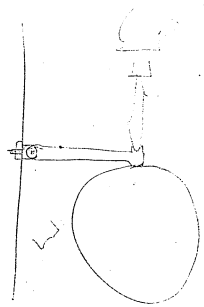
L. W. Lawson

May 23/79

Cerium Oxalate

Heated to drive off H_2O and CO_2 — Dissolved oxide in HCl — Evaporated and dissolved in H_2O; residue SiO_2 —

H_2S, Precip. Black — contains Bi, In or Cd — minute quantities



Make

3ß Pp chalk
100 gn Hg Acet.
1 ß Caustic Na

3ß Pp Chalk
100 gn Hg Acet
1ß Caustic K

6ß Chalk
Chloride Lithia 1 pint ß
18 gn Hg Acet.

Chalk 6 B
Caustic Soda 1/Flask B.
Hot water Syringy with
gelatine

3 ℥ Chalk
90 ℳ Hg Acet
1 ℔ Aq

6

61 ℥. Chalk
180 ℳ. Hg Acet

36

12 [redacted] By Check
1 5 qts Asst
2 gt (Plus) [illegible]

Hand lift and make bellows to
just blow pressure [illegible]
K.

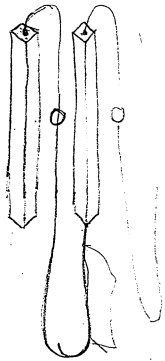
Lawson

Make a Saturated Solution of Caustic Soda & mix ¼ its weight Chalk and dip cotton

Make a Saturated Solution of Caustic Soda Mix ½ weight

Make Saturated Solution Caustic Soda

Make a button of fused
Caustic Soda +
Caustic K



12

Lawson June 9th 1919 13

Have Sequeira help you and make the following:-

1 Make Saturated Solution of Caustic Na and mix ¼ th. weight of Chalk dry out and make Button with good pressure (2 Buttons) Another ~~½ weight~~

2 Ditto with Caustic Ks Another ½ weight (2 buttons)

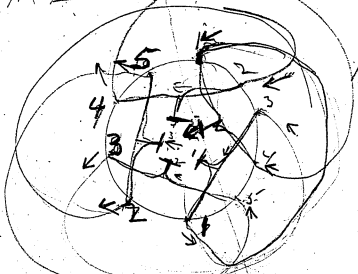
3 In a sat. Sol. of Caustic Na add as much Chalk as make thick paste Then fr weight of (each Button add of Brown Hay 2 Buttons

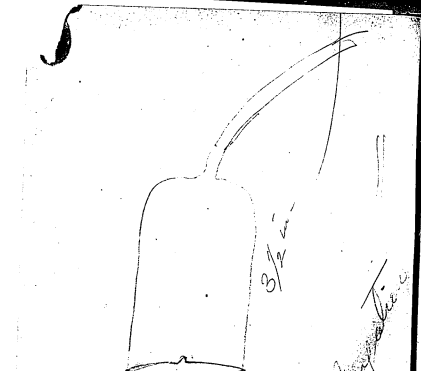
4 Ditto with Caustic Ks

5 Make 1 button of fused Caustic Na

6 Sticks of fused Caustic KI

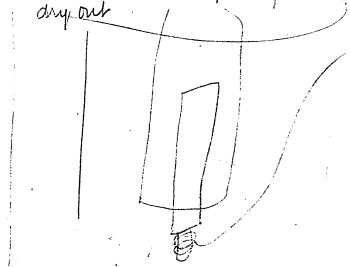
3 chalk
9 acel. Hg
1 Mn





Sat Sol of Na C dried out by evaporation and then mixed in equal proportion dry with regular Britton's

Would one without ~~pan~~ Sifting and dry out



47 1.6721
Comp 2 35 7.6289
Comp 3 9.5229
8.8239
62 1.792 4
.6153

97 1.9868
8.8239
.8107

115 2.0607
8.8239
.8816

131 2.1173
8.8239
.9912

162 2.2095
8.8239
1.0334

178 2.2504
8.8239
1.0743

228 2.3579
8.8239
1.1818

280 2.4472
8.8239
1.2711

Experiments by Brand
on Carbonyd Transmissant
Combinations. June 12 1880.

Cotton Cloth carbonyzed nicely
but cannot use such cloth
fine enough in meaning to
make narrow enough slots.

Flour paper makes a
very light + puffy but when
carbonized it crumbles too much

Gum Tragacanth works nicely
think it will go as a Carbonized
well + don't require so much
good Lagacanth + they are

Jany 12. 1863

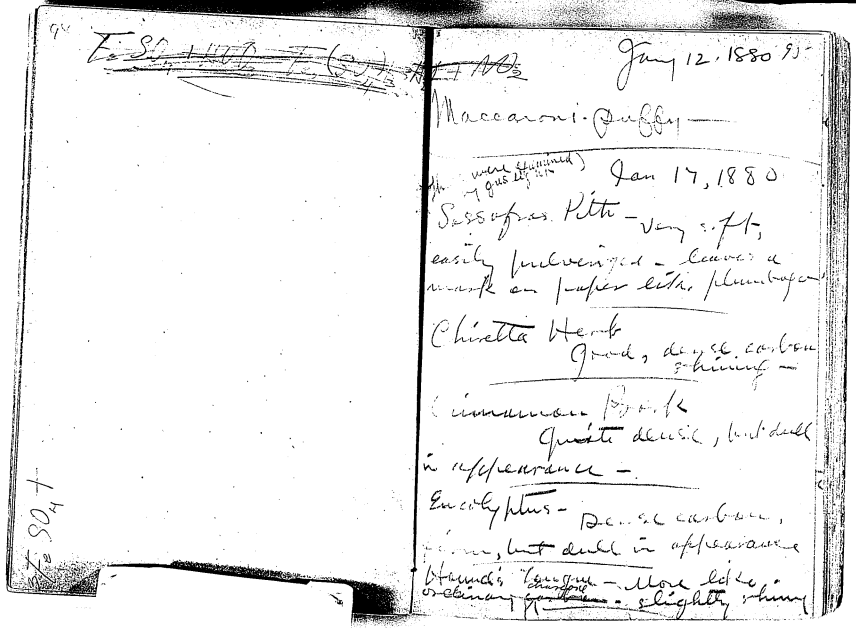
Asphaltum.
Very brittle but succeeding
Gives much Carbon in smoke.

Gum Myrrh - gives much carbon
& light weight —

Gum Kino — [illegible] —

Gum Copal gives thin brittle
very shining Carbon like
asphaltum

Leather Carbon not much
light —



Jan. 17, 1880

Swamp Huckleberry - Does not seem to be well carbonized - Surface glittens in gaslight -

Buckbean Root - Dull, porous -

Poppy Caps - Shining, vesicular, surface not honeycombed, however -

Rosin Weed - Shining, fibrous; not well carbonized -

High Elder Berry - Firm, fracture shining -

Indian Tobacco - Puffy -

Jan, 17, 1880 — 99

White Wood Bark — Firm, fracture shining.

Indian Violet — Very powdery, not having a high lustre —

Pennsylvania Peat — Carbon dense, fracture shining —

Augustine Bark — Porous and dull —

Yellow Jaccaranda — Carbon dense, fracture slightly dull —

Pareira Brava — Not so dense as preceding —

Jan. 17, 1880 101

Ginger Root -
Bulb and leaves -

Peruvy Root -
Bulb, friable.

Sweet Birch Bark -
Dense, slightly shining -

Cassia Root - Leaves -

Jan. 18, 1880

Black Weed
Carbonized very much,
silky lustre -

Sugar Puffy, shining

Black Sugar Puffy, shining

Clinton River

Downey, Anderson

Cook Pontiac, Auld

Pipelon Brook Franklin

April 9- 1880 -

Experiments began today for the purpose of removing gums, resins, ect- from the various kinds of woods

All foreign substances to be removed leaving nothing but the cellular structure of the wood -

Small pieces of the different kinds of wood 1 or 2 in. square and 1/16 in. thick are first weighed in air then placed in alcohol and allowed to remain until all matter soluble in alcohol has been removed - They are then placed in ether until all matter soluble in ether has been removed, next are treated with aqua ammonia, hydrochloric acid, well washed

in water and subjected
to the action of chlorine gas

Woods placed in alcohol—
Weight before
Wt. = weight—

	Grms.
Muga ~~(illegible)~~	.8935
Tiger	.9077
Rose	1.1477
Tulip	.943
Mahogany	.8815
Lignabola	1.6526
Turtle	1.4642
Amaranth	1.274
San Domingo Mahogany	1.1895
White Pine	.778
Orange	.3649
Sassafras	.4476
Milli Wood	1.218
Dogwood	.750

Ebony	2.3865
White Thorn	1.2925
Apple	1.918
Black Walnut	1.731
Oak	1.469

April 13-80

Woods, ~~reduced~~ from alcohol and placed in ether

From:-	Color of alcoholic extract
Thuya	Light; transparent brown
Tiger	" greenish brown
Rose	Dark, opaque brown
Tulip	Light; transparent rose
Mahogany	Similar to Tiger but much fuller
Canebrake	Deep red
Turtle XX	Similar to Rose but much fuller
Amaranth	Magenta
San Domingo Mahogany	Similar to Mahogany but darker
White Pine	Colorless
Orange	"

Ebony placed in nitric acid:- alcoholic and ether seem to have but little action on the coloring matter. Nitric acid extracts the coloring matter from ebony wood without injuring its tissue."

Gmelin IX- 160

This was tried using ebony wood but the strength of the wood was completely destroyed; perhaps the acid used was too conc., dilute might give better results.

Specimen	Color
Mahi Wood	Dingy, barely perceptible
Dogwood	Colorless
Ebony	Dingy, barely perceptible
White Thorn	" " "
Apple	" " "
Black Walnut	Very pale umber
Oak	Colorless

April 19-

Removed from ether and placed in agua ammonia

Color of the etheric extract from eagle wood similar to that of the alcoholic extract.

April 25-

Removed from agua ammonia well washed in water and placed in dilute hydrochloric acid-

Color of the ammonias extract similar to that of the alcoholic

116

348

480 | 26.4 | 348
212
195
792
480 | 1904 | 160
1488
288

117

May 4

Removed from ~~this~~ Hcl solution and washed in water

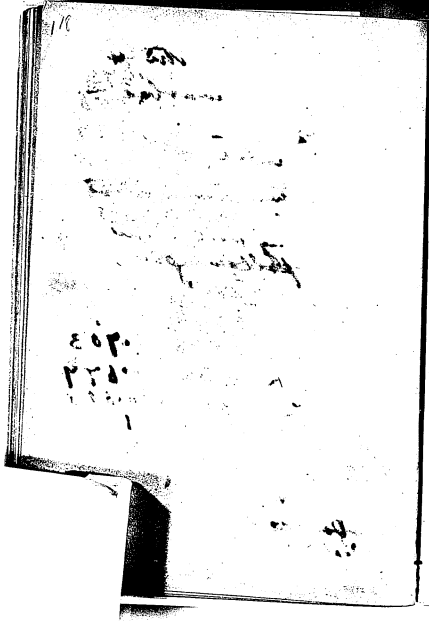
May 12

Treated with Cl gas, and washed in water

May 25

After being well dried they gave the following weights:

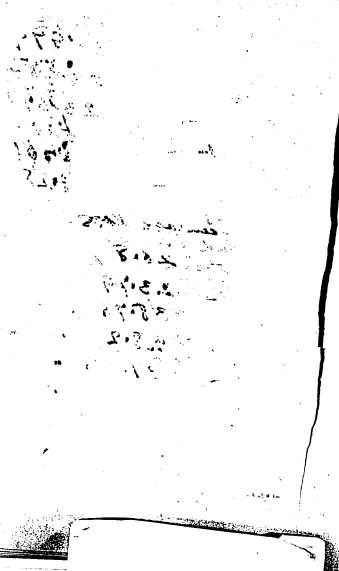
Hunga	.654
Ligia	.692
Rose	.703
Lilly	.677
Mahogany	.608
Canabola	1.224
Turtle	1.147
Amaranth	.840
San Domingo Mahogany	.828
White Pine	.674
Orange	.256



Sassafras	.361
White Wood	.979
Dogwood	.958
White Thorn	.979
Apple	1.465
Black Walnut	1.461
Oak	1.281

Percentage loss.

Hunga	—	26.8
Tiger	—	23.79 "
Rose	—	38.76 "
Tulip	—	28.2 "
Mehogeny	—	31.06 "
Cwabola	—	25.9 "
Turtle	—	21.65 "
Amaranth	—	30.14 "
San Domingo Mahogany	—	30.42 "
White Pine	—	13.37 "
Orange	—	29.86 "



Sassafras	—	19·42 %
White Wood	—	19·62 "
Dogwood	—	25·6 "
White Thorn	—	24·28 "
Apple	—	23·61 "
Black Walnut	—	15·6 "
Oak	—	12·8 "

May 26

Reweighed the woods, after allowing them to remain exposed to the atmosphere since the former weighing

Hunga	—	·0075 %	gain in weight
Light	—	·0058 "	" "
Rose	—	·0056 "	" "
Tulip	—	·0103 "	" "
Mahogany	—	·0024 "	loss "
Canabolk	—	·0212 "	gain "
Cuitta	—	·0165 "	" "
Swamutta	—	·0190 "	" "

San Domingo Mahogany	—	.0000	Again — weight
White Pine	—	.0013	" " "
Orange	—	.0059	" loss "
Sassafras	—	.0028	" " "
White wood	—	.0122	" gain "
Dogwood	—	.0000	" " "
White Thorn	—	.0102	" " "
Apple	—	.0150	" " "
Black Walnut	—	.0123	" " "
Oak	—	.0109	" " "

May 27

Reweighed the woods again today

Lejon	—	.0043	% loss — Wt.
Rose	—	.0014	" gain "
Cucabola	—	.0040	" " "
Amaranth	—	.0022	" " "
San Domingo Mahogany	—	.0024	" loss "
White Pine	—	.0029	" " "

Apple — .0060 % gain = Wt.
Black Walnut — .0033 " " "
Oak — .0030 " " "

In the weights of the others there was no difference —

Placed in alcohol today the following woods :

	Wts.
Fustic	.989
Bay	.6695
White Holly	.6315
Hemlock	.975
Spruce	.894
Gum wood	.4404
Ash	1.265
Lignum Vitae	2.632
Bass	.9285
Mora	1.388
Cherry	.735
Maple	1.367
Camphor	.946

Bird's Eye Maple	.946
Yellow Pine	1.1375
Red Cedar	1.0215
Satin	1.710
Cabora	2.807

June 7

Removed the alcohol and placed in ether

	Color of the alcoholic extract
Fustic	Fine Yellow
Bay	Darker "
White Holly	Colorless
Hemlock	"
Spruce	"
Gum wood	"
Ash	
Lignum Vitae	Dirty Yellow
Bass	Colorless
Mora	Umber

Cherry	Colorless
Maple	"
Camphor	slightly colored
Bird's Eye Maple	"
Yellow Pine	
Red Cedar	Light Pink
Satin	Colorless
Cocoa	Light Brown

June 15-
Removed from ether and placed in aqua ammonia

June 23-
Removed from the aqua ammonia and well washed in water -

June 26
Placed in dilute HCl

July 1
Removed from HCl and treated with water -

June 17

Placed 100 grams finely cut Bast fibre in 2 litres alcohol

June 28

Removed alcoholic extract from fibre, submitted to distillation, concentrated to 300 c.c, evaporated to dryness over steam bath and weighed residue —

Weight of gum ext. extracted by means of alcohol

1.5-5-6 grams

% by weight 1.5-5-6

The fibres which had been treated with alcohol were placed in 2 litres sulphuric ether today

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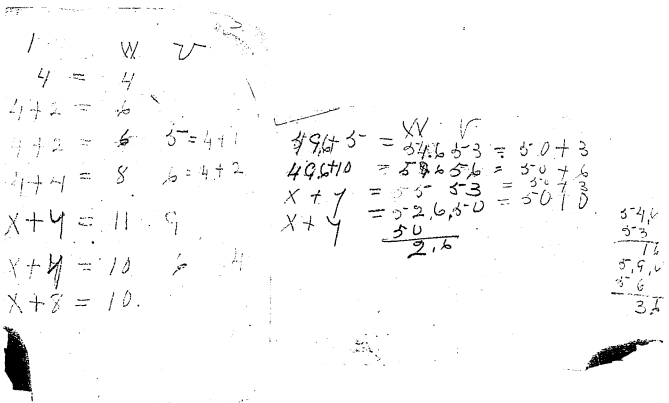

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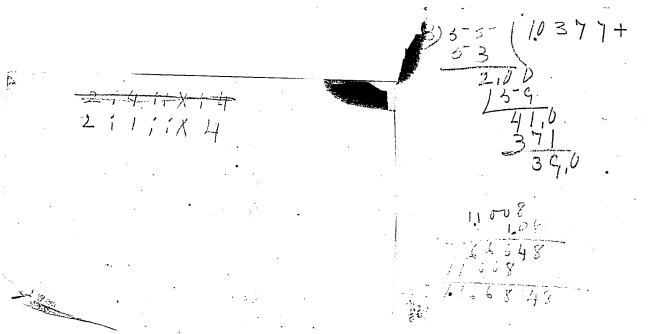


5-/600

5-/1000/=

5

25

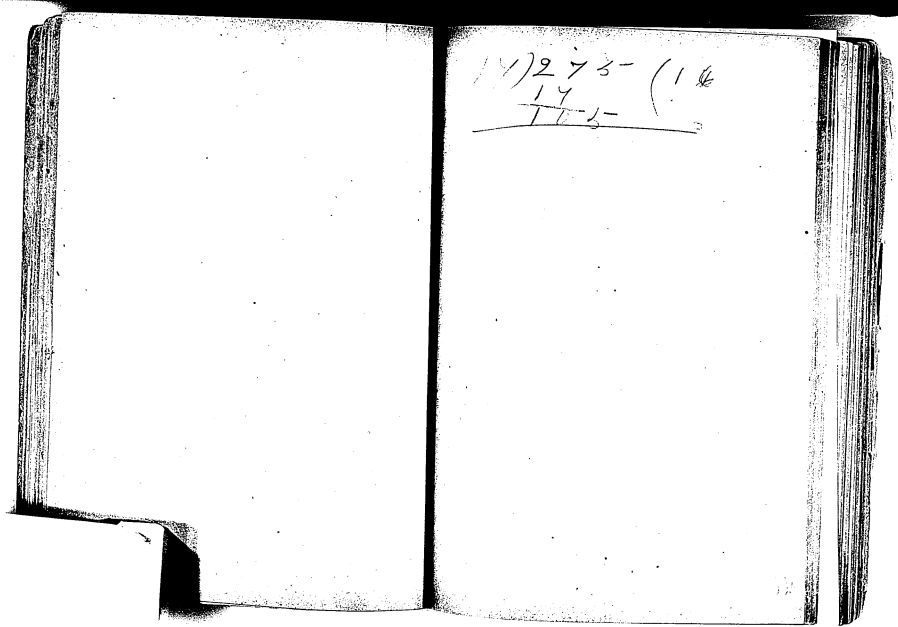
10

40

$\frac{5}{200}$ $= \frac{1}{4}$

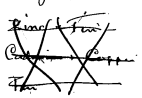
10

500.



Copper	90	Zinc	10
Copper	80	Zinc	20
"	70	"	30
"	60	"	40
"	50	"	50
"	40	"	60
"	30	"	70
"	20	"	80
"	10	"	90

Varying as above.



Copper + Iron
" " Lead
" " Cadmium
" " Antimony
" " Arsenic
" "

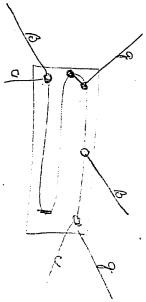
Zinc + Iron
" Lead
" Cadmium
" Antimony
" Arsenic

Iron + Lead
" Cadmium
" Antimony
" Arsenic

Lead + Cadmium
" " Antimony
Arsenic

Cadmium + Antimony
" Arsenic

Antimony + Arsenic

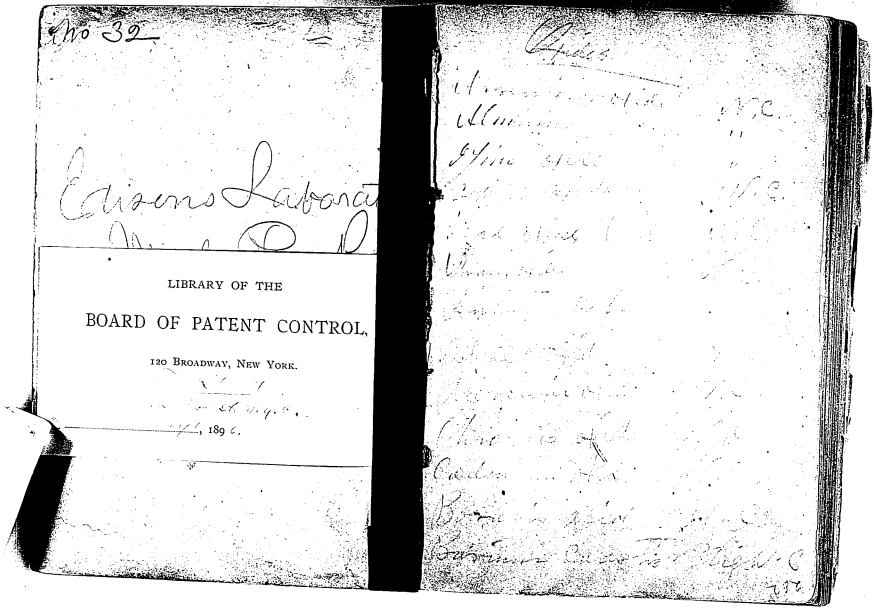


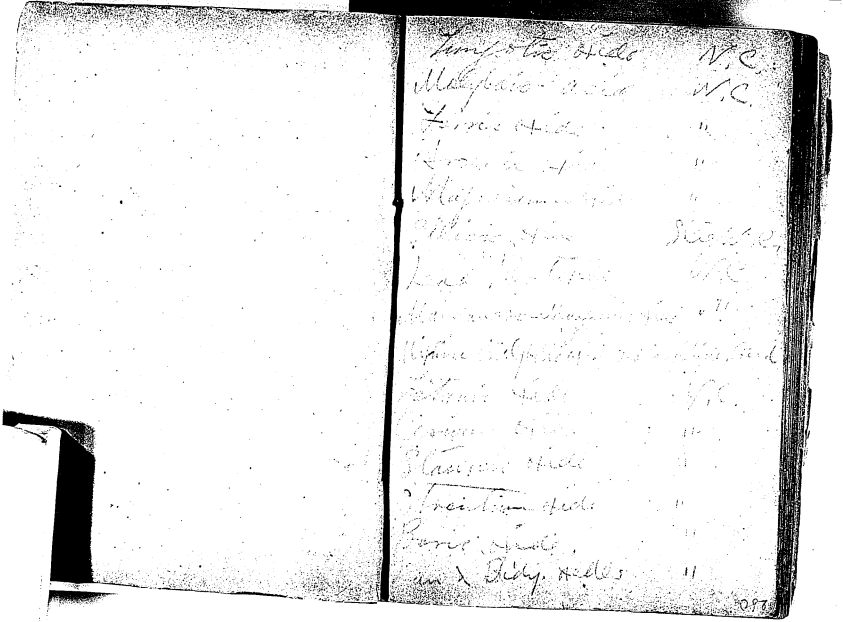
½ Size at 16 candles (Candle)
75 hours; Res 79 ~~8~~ 80
ohms 13.2 per hp

at 8½ candles 82 • 3 -

No 32

Edisons Laborat
Menlo Park
New Jers


No 32
Edisons Laborat
LIBRARY OF THE
BOARD OF PATENT CONTROL,
120 BROADWAY, NEW YORK.
, 189 .

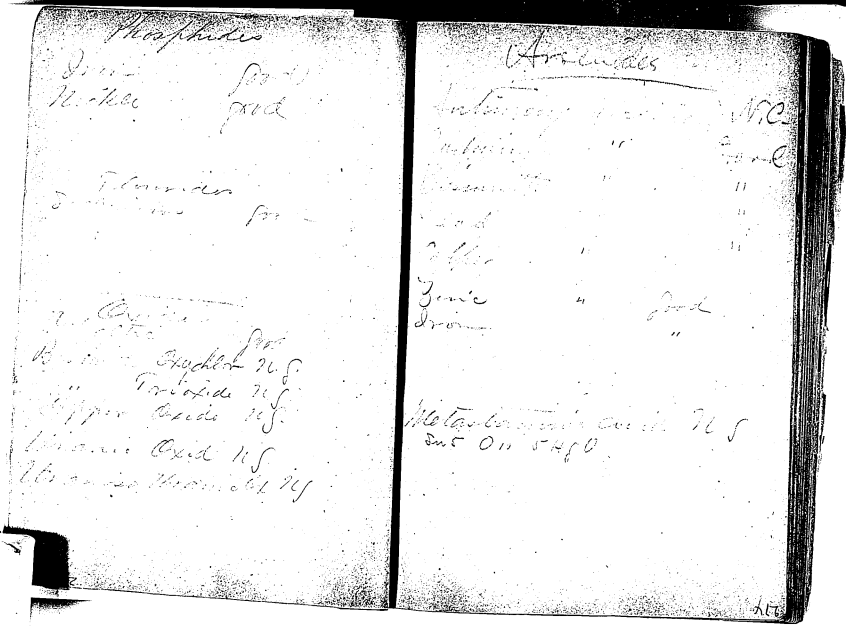


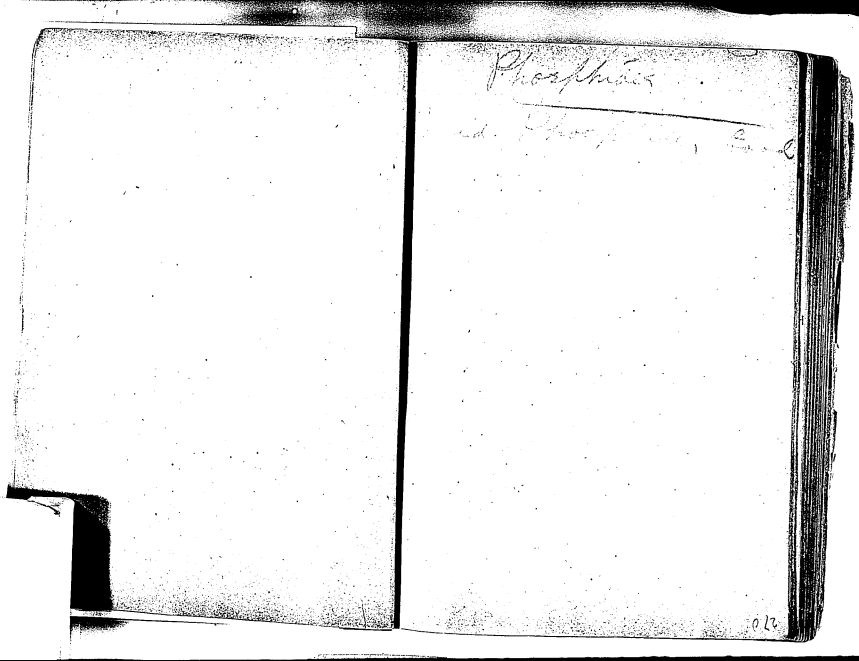
Nickel Peroxide W.C.

Ferro-ferric (Nickel) Good.

115) 6200
31
345
340) 3565
89.

2,00) 62,00
31




Phosphates
022

~~Solubility~~

Solubility of

Hydrogen-dioxide Phosphate

50 c.c. distilled H_2O at 25° C = 49.5 Gr.

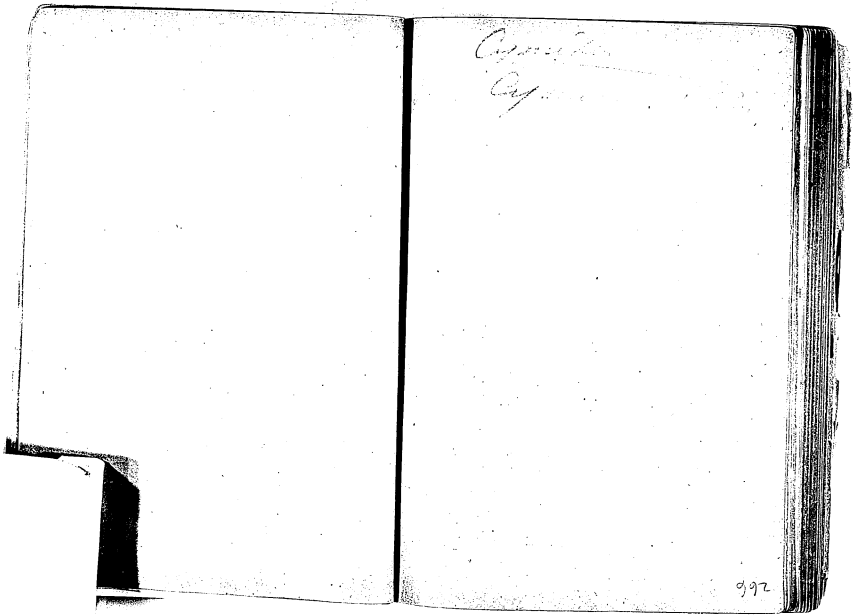
50 c.c. H_2O + 5 Grams [illegible] = 54.8 Gr.

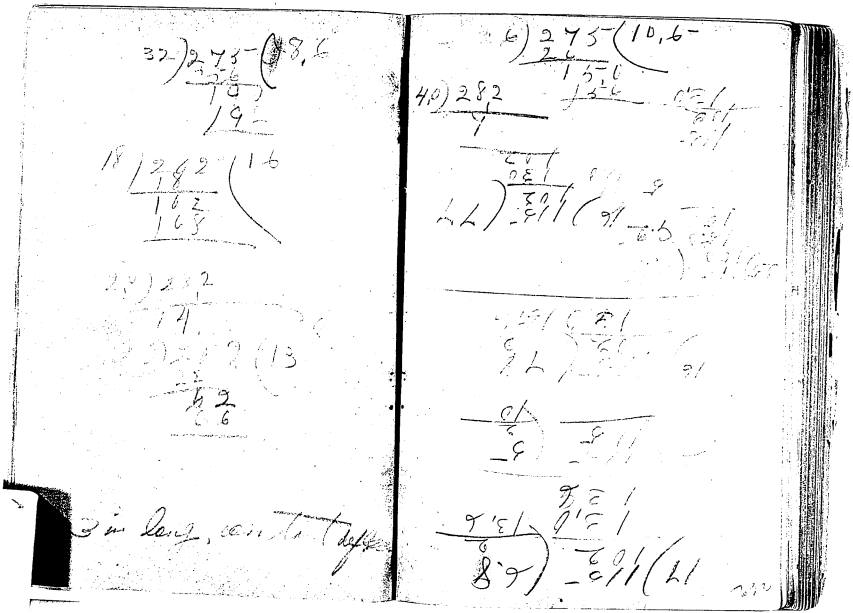
50 c.c. H_2O + 5 " = 53.00 Gr.

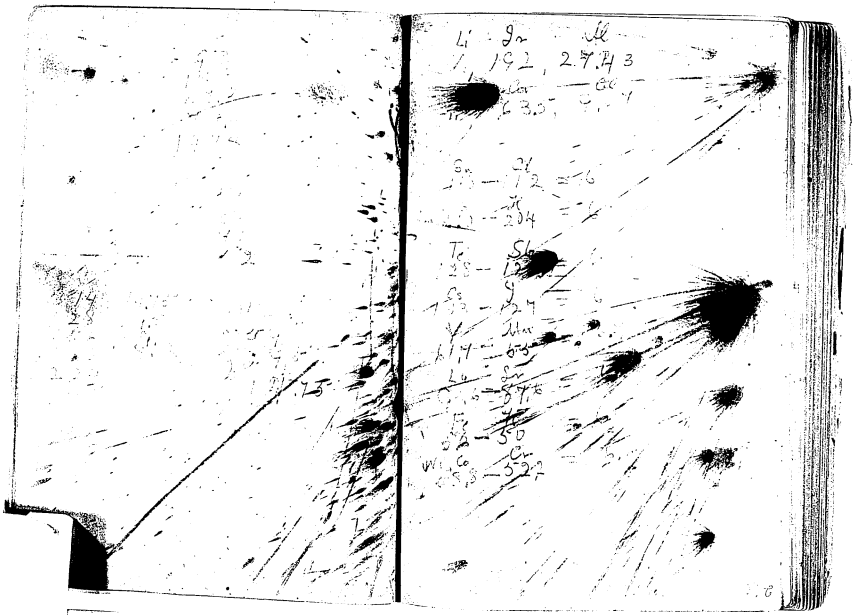
50 c.c. at 5% Na sodu = 52.6 Gr.

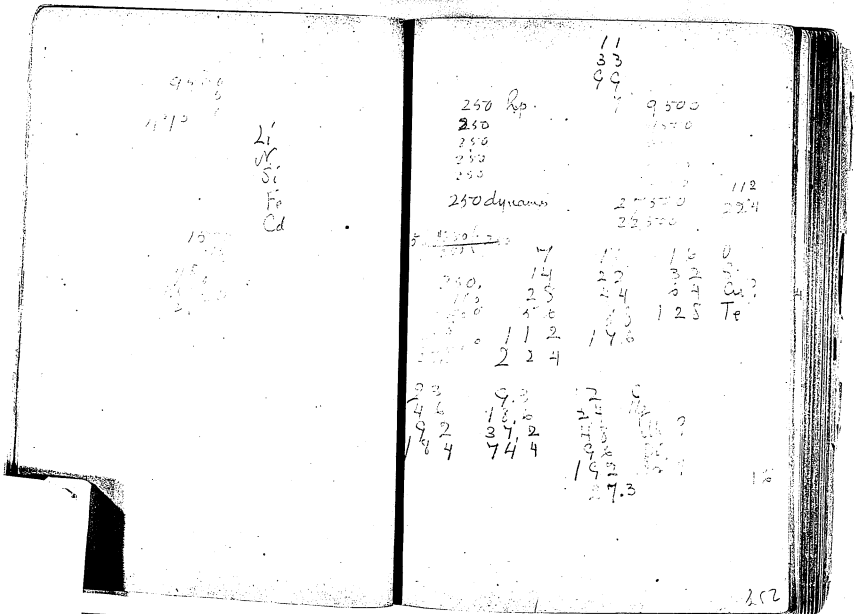
" = 3.

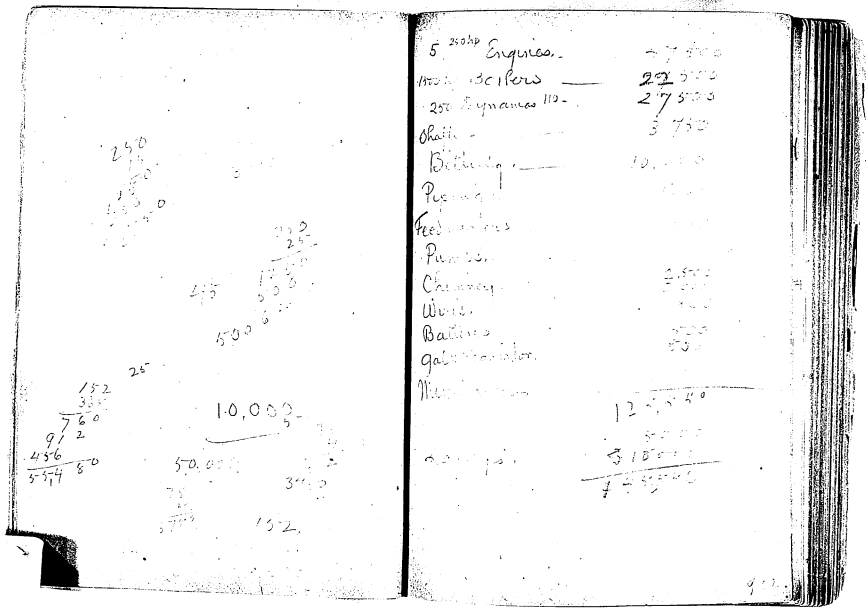
20 parts by weight [illegible] in 100 parts H_2O at 25° C.

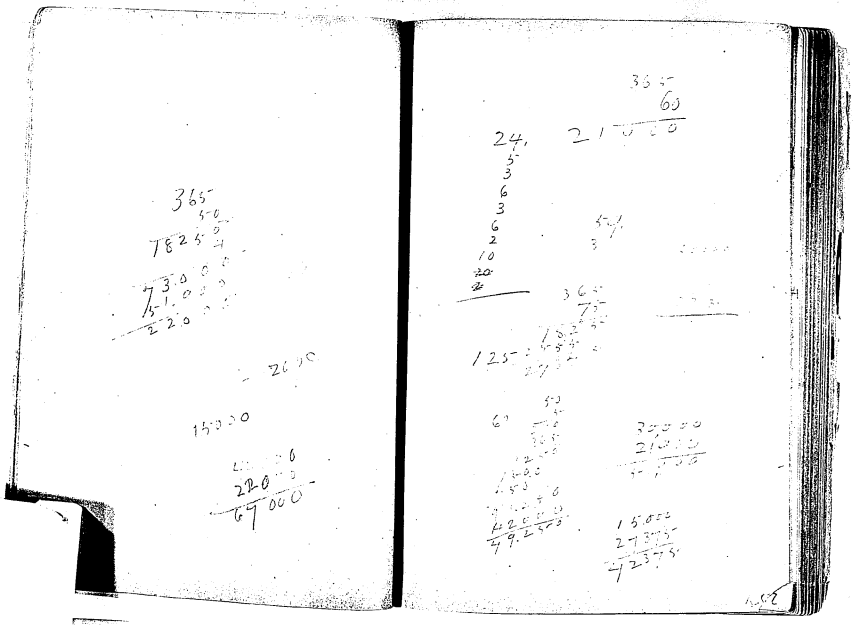


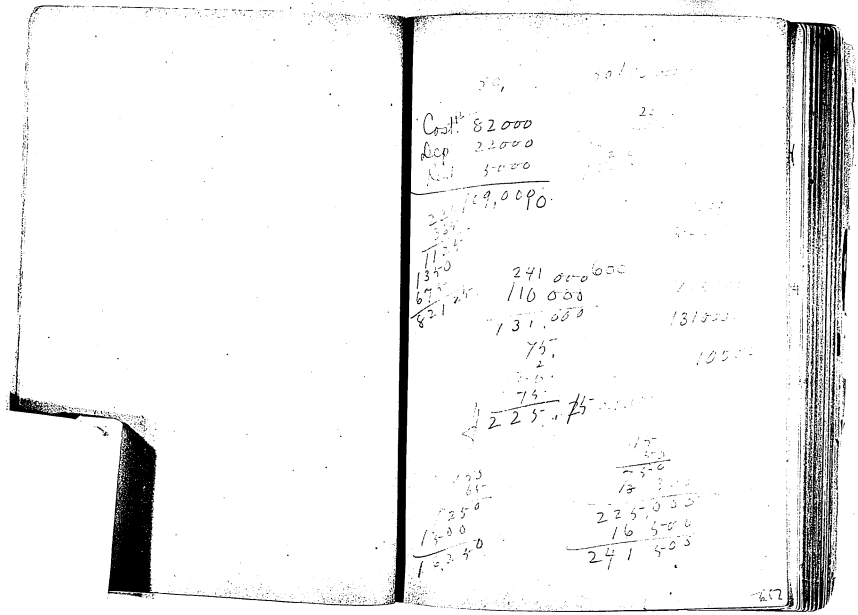





250 dynes
Li
K
Si
Fe
Cd
Te






Cash 82000
Dep 22000
5000
109000
241 000 600
110 000
131 000 000
75
225 75
225 0 0 0
16 5 0 0
241 5 0 0

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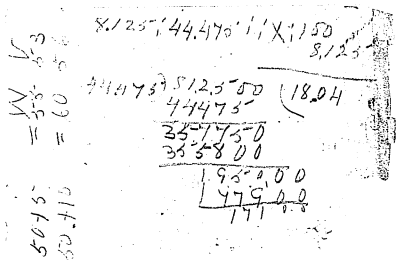


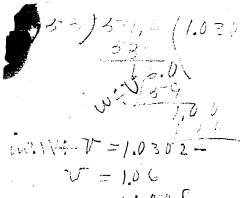
All through before
Sulphur charge

Sulphur 20
Tin 20
Chl Am 20
after first heating
stirred up + added
more chl. by 5% &
Reps down heat
but seems to blacken
Now

Sulphur 40
Tin 40
Chl Am 40
good but blackens a
little on b/p Heat 40

Sulphur 40
Tin 40
Chl Am 40
not good

Tin 40
Sulph 15
Chl Am 15
about work good
seems to blacken



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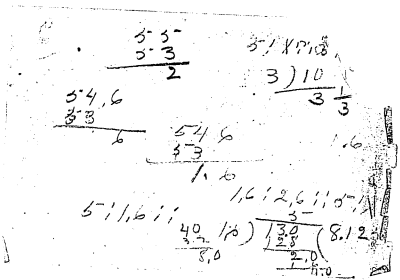

Daniel: CCC through 6200 Ohms
= 280°

Those are more through to 3100
Ohms = 40°

40) 280° (7 ; 7×2=14
280

R = .13

Those between 3100 Ohms = 37°

R = .04 37) 280 (7.4 ; 7.4×2=14.8
259
210

15,4
10,2
5,2

(Lowe and Child & Auttmann) Those between 2.8 Ohms
= 5.5° R less than .01

2,00) 62,00 55) 280 (5
51 275
5
55

5
55